



Appeal brief under 37 C.F.R. § 1.192
Application Serial No.: 09/384,088
Attorney Docket No.: 23452-092

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS : Brendan MURRAY *et al.* CONFIRMATION No.: 7366
SERIAL NUMBER : 09/384,088 EXAMINER : Channavajjala
FILING DATE : August 27, 1999 ART UNIT : 2177
FOR : SYSTEM AND METHOD FOR EVALUATING CHARACTER SETS TO
GENERATE A SEARCH INDEX

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Appellants' Brief On Appeal Under 37 C.F.R. §1.192

Sir:

Further to the Notice of Appeal filed on July 31, 2003, Appellants' herewith submit Appellants' Brief on Appeal in triplicate pursuant to 37 C.F.R. §1.192(a).

It is not believed that extensions of time or fees are required beyond those that may otherwise be provided for in documents accompanying this paper.

However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned for under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 50-0311 (*Ref. No. 23452-092*).

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(1) REAL PARTY IN INTEREST

By virtue of the assignment recorded December 16, 1999 at reel 010449, frame 0049, the real party in interest is **International Business Machines**, a New York corporation having a place of business in Armonk, New York.

(2) RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

(3) STATUS OF THE CLAIMS

Claims 1, 2, 4-10, 12-18, 20-26, and 28-32 stand rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over U.S. Patent Number 5,778, 400 issued to Tateno ("Tateno") in view of U.S. Patent Number 5,946,648 issued to Halstead, Jr. et al. ("Halstead"). Claims 3, 11, 19, and 27 stand rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead and further in view of U.S. Patent Number 6,321,192 issued to Houchin et al. ("Houchin"). Claims 37 and 40-43 stand rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead and further in view of U.S. Patent Number 5,946,648 issued to Marshall et al., ("Marshall").

Appellants' appeal the rejections of each of claims 1-32, 37, and 41-43.

(4) STATUS OF AMENDMENTS

Appellants have not amended the claims subsequent to the Final Office Action dated March 31, 2003 ("Office Action").

(5) SUMMARY OF THE INVENTION

The invention relates to a computerized system and method for comparing each character of a textual message associated with an undetermined language to predetermined candidate character sets. One advantage of the invention is that it facilitates determining the language of the message. Another

advantage of the invention is that it enables performing a search based the determined language. According to one embodiment, the system accepts an input textual message of unknown language. According to another embodiment, if the language of the message is unknown, then the system parses each character of the accepted message and evaluates each character against candidate character sets corresponding to various languages, so as to identify character sets that can express that message. See page 2, line 22 through page 3, line 23, page 6, lines 9-22, page 11, lines 4-10 of the specification. The evaluation feature of the invention can be applied to multipart documents. The results of the evaluation can be indexed according to assigned character sets and the language of the matched query strings. See page 17, lines 5-21 of the specification and page 23 abstract.

(6) ISSUES

Whether claims 1, 2, 4-10, 12-18, 20-26, and 28-32 are unpatentable, under 35 U.S.C. § 103(a), over Tateno in view of Halstead.

Whether claims 3, 11, 19, and 27 are unpatentable, under 35 U.S.C. § 103(a), over Tateno in view of Halstead and further in view of Houchin.

Whether claims 37 and 40-43 are unpatentable, under 35 U.S.C. § 103(a), over Tateno in view of Halstead and further in view of Marshall.

(7) GROUPING OF CLAIMS

Claims 1-32, 37, and 40-43 are separately patentable. Appellants, however, have grouped claims that include similar features. In particular, Appellants request that claims 1, 9, 17, and 25 be considered to stand and fall together; that claims 2, 10, 18, and 26 be considered to stand and fall together; that claims 3, 11, 19, and 27 be considered to stand and fall together; that claims 4, 12, 20, and 28 be considered to stand and fall together; that claims 5, 13, 21, and 29 be considered to stand and fall together; that claims 6, 14, 22, and 30 be

considered to stand and fall together; that claims 7, 15, 23, and 31 be considered to stand and fall together; that claims 8, 16, 24, and 32 be considered to stand and fall together; that claims 40, 41, 42, and 43 be considered to stand and fall together; and that claim 37 be considered to stand separately from other claims.

(8) ARGUMENT

With respect to the issue presented above, the question to be resolved is whether the asserted rejection is a proper rejection under 35 U.S.C. § 103(a). Appellants respectfully submit that the asserted rejection is improper because the combination of the references cited by the Examiner fail to teach or suggest all the claim limitations. In addition, Appellants respectfully submit that the asserted rejection is improper because the Examiner failed to provide proper motivation to combine the cited references. Appellants provide below a discussion of the requirements for a *prima facie* case of obviousness under 35 U.S.C. § 103(a) and an application of these requirements to each claim.

Requirements for prima facie case of obviousness

As stated in the MPEP § 2143, three requirements must be met to establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a). The requirements are: (1) the prior art must teach or suggest all the claim limitations, (2) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or combine reference teachings, and (3) there must be a reasonable expectation of success.

Appellants respectfully submit that at least the first two requirements are not met by the asserted rejection. Therefore, Appellants examine those requirements in further detail.

All of the claim limitations must be taught or suggested

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Suggestion or Motivation to modify the references

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Claims 1, 9, 17, and 25

Claims 1, 9, 17, and 25 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead. Claim 1 includes, *inter alia*, the feature of *evaluating the search string by comparing each of the characters of the search string to a plurality of pre-determined candidate character sets to determine one or more matches between the plurality of pre-determined candidate character sets and the search string*. Support for this feature is found at page 11, lines 4-7 of the specification. At least this feature is not taught or suggested in Tateno and Halstead, alone or in combination with one another.

The Examiner acknowledges that Tateno does not disclose the claimed limitation 'evaluating the search string by comparing each of the characters of the search string to a plurality of predetermined set of candidate sets' (See the Office Action, page 18, lines 14-16). However, the Examiner relies on col. 6, lines 54-63, col. 7, lines 48-61, col. 9, lines 40-50, col. 10, lines 20-40 and lines 63-67,

and col. 12, line 65-67 in Halstead to teach this feature (See the Office Action, page 18, lines 17-21). Furthermore, the Examiner states that comparing the characters of the search string corresponds to Halstead's matching of stem characters in the prefix analysis as detailed in Figures 18 and 19 of Halstead (See the Office Action, page 18, lines 20-21).

Appellants respectfully submit that the portions relied upon by the Examiner in Halstead disclose postfix, stem, and prefix morphology analysis on broken subsections of an inputted Japanese text string. These postfix, stem and prefix are various morphemes (i.e., morphological sections) of a word. As one of ordinary skill in the art is aware, morphemes usually represents a group of multiple characters taken together. Thus, any analysis on each of these morphemes is on the group of characters as a whole, rather than each individual character within the group.

Moreover, Halstead discloses an analysis for a stem morpheme by matching the whole stem morpheme against words stored in a primary lexicon file, stored opheme patterns, and stored Kanji bi-grams (See col. 9, lines 35-50, col. 10, lines 12-19, and col. 12, lines 6-21 of Halstead). Therefore, Halstead does not teach or suggest comparing each character of the inputted search string to a plurality of predetermined candidate character sets as set forth in claim 1. For at least the foregoing reasons, Appellants respectfully submit that claim 1 is patentable over Tateno in view of Halstead.

For the sake of argument, if the prefix morpheme is considered by the Examiner as a single character, Halstead still remains deficient in teaching or suggesting evaluating each of the characters of the inputted search string to a plurality of pre-determined candidate character sets, as set forth in claim 1, because the prefix is not the only morpheme in the inputted Japanese text string disclosed by Halstead. In addition to prefix, the inputted Japanese text string in Halstead includes stem and postfix (See Fig. 2 of Halstead). A stem can not be

considered a single character. For at least this additional reason, Appellants respectfully submit that claim 1 is patentable over Tateno in view of Halstead.

Furthermore, the Examiner asserts that character sets corresponds to tags or words in Tateno (See the Office Action, page 18, lines 10-11). Also, the Examiner asserts that character sets corresponds to the prefix morphology file, Figure 18, element 132 of Halstead (See the Office Action, page 19, lines 1-2). Appellants respectfully submit that a character set is a digital representation involving binaries. One skilled in the art would not equate character sets with either tags or words in Tateno or prefix morphology file in Halstead. Thus, the Examiner's interpretation of character sets is improper. Therefore, for at least this additional reason, Appellants respectfully request that the rejection of claim be withdrawn.

Claims 9, 17, and 25 include features similar to those discussed above with regard to claim 1. For at least these reasons, Appellants submit that the rejection of these claims are improper and must be withdrawn.

Dependent Claims 2, 10, 18, and 26

Claims 2, 10, 18, and 26 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead. Dependent claims 2, 10, 18, and 26 each depend from a corresponding one of independent claims 1, 9, 17 and 25 and, therefore, contain the features recited in the independent claims. As mentioned above, Tateno and Halstead, alone or in combination with one another fail to teach or suggest each of the features in the independent claims and, thus, necessarily fail to teach or suggest each of the features in the dependent claims. Therefore, Appellants respectfully submit that claims 2, 10, 18, and 26 are also patentable at least by virtue of their dependency.

Furthermore, claim 2 includes, *inter alia*, the feature of "comparing each character of the search string to an entry for each of the candidate character sets

in a character table bank.” At least this feature is not taught or suggested by Tateno and Halstead, alone or in combination with one another.

Apparently, the Examiner relies on the reference in Halstead to postfix map in a lexicon look-up table to teach this feature (See col. 9, lines 51-60 and col. 10, lines 1-3 and 26-40 of Halstead). However, this is not the same as Appellants’ entry for each of the candidate character sets in a character table bank. One skilled in the art would not equate a postfix (i.e., a morpheme) map to an entry for character set. Therefore, for at least this additional reason, Appellants respectfully request that the rejection of claim 2 be withdrawn.

Claims 10, 18, and 26 include features similar to those discussed above with regard to claim 2. For at least the additional foregoing reasons, Appellants submit that the rejection of these claims are improper and must be withdrawn.

Dependent Claims 4, 12, 20, and 28

Claims 4, 12, 20, and 28 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead. Dependent claims 4, 12, 20, and 28 each indirectly depend from a corresponding one of independent claims 1, 9, 17 and 25 and, therefore, contain the features recited in the independent claims. As mentioned above, Tateno and Halstead, alone or in combination with one another fail to teach or suggest each of the features in the independent claims and, thus, necessarily fail to teach or suggest each of the features in the dependent claims. Therefore, Appellants respectfully submit that claims 4, 12, 20, and 28 are also patentable at least by virtue of their dependency.

Furthermore, claims 4, 12, 20 and 28 each directly depend from dependent claims 3, 9, 19, and 27 respectively, and therefore contain the features recited in the dependent claims 3, 9, 19, and 20 respectively.

Claim 4 includes, *inter alia*, the feature of “universal code is Unicode,” and claim 3 includes, *inter alia*, the feature of “testing the ability of each candidate

character set to express that character by performing a logical mask between a universal code for that character and an indicator in the character table bank indicating whether each of the candidate character sets contains that character.” Accordingly, claim 4 includes performing a logical mask between a Unicode for that character and an indicator in the character table bank.

Apparently, the Examiner relies on the description in Halstead which is directed to 16 bit Unicode value of a node of a morpheme so as to identify associated morphemes, to teach this feature (See col. 8, lines 15-21 of Halstead). However, this is not the same as performing a logical mask between a Unicode for a character and an indicator in a character table bank, as set forth in claim 4. Therefore, for at least this additional reason, Appellants respectfully request that the rejection of claim 4 be withdrawn.

Claims 12, 20, and 28 include features similar to those discussed above with regard to claim 4. For at least the additional foregoing reasons, Appellants submit that the rejection of these claims are improper and must be withdrawn.

Dependent Claims 5, 13, 21, and 29

Claims 5, 13, 21, and 29 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead. Dependent claims 5, 13, 21, and 29 each depend from a corresponding one of independent claims 1, 9, 17 and 25 and, therefore, contain the features recited in the independent claims. As mentioned above, Tateno and Halstead, alone or in combination with one another fail to teach or suggest each of the features in the independent claims and, thus, necessarily fail to teach or suggest each of the features in the dependent claims. Therefore, Appellants respectfully submit that claims 5, 13, 21, and 29 are also patentable at least by virtue of their dependency.

Furthermore, claim 5 includes, *inter alia*, the feature of “computing a total number of characters matched to each of the candidate character sets.” At least

this feature is not taught or suggested by Tateno and Halstead, alone or in combination with one another.

Apparently, the Examiner relies on the disclosure in Halstead which is directed to scoring leaves in primary lexicon look-up (i.e., a look-up having morphemes or morphological sets for a Japanese text) to teach this feature (See col. 9, lines 51-67 and col. 10, lines 1-3 of Halstead). However, this is not the same as Appellants' computing a total number of characters matched to each of the candidate character sets, as set forth in the claim. Therefore, for at least this additional reason, Appellants respectfully request that the rejection of claim 5 be withdrawn.

Claims 13, 21, and 29 include features similar to those discussed above with regard to claim 5. For at least the additional foregoing reasons, Appellants submit that the rejection of these claims are improper and must be withdrawn.

Dependent Claims 6, 14, 22, and 30

Claims 6, 14, 22, and 30 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead. Dependent claims 6, 14, 22, and 30 each depend from a corresponding one of independent claims 1, 9, 17 and 25 and, therefore, contain the features recited in the independent claims. As mentioned above, Tateno and Halstead, alone or in combination with one another fail to teach or suggest each of the features in the independent claims and, thus, necessarily fail to teach or suggest each of the features in the dependent claims. Therefore, Appellants respectfully submit that claims 6, 14, 22, and 30 are also patentable at least by virtue of their dependency.

Furthermore, claim 6 includes, *inter alia*, the feature of "selecting a best match based upon the total number of characters matched to each of the candidate character sets." At least this feature is not taught or suggested by Tateno and Halstead, alone or in combination with one another.

Apparently, the Examiner relies on the disclosure in Halstead which is directed to frequency of occurrence of opheme template pattern to teach this feature (See col. 10, lines 63-67 and col. 11, lines 1-7 of Halstead). However, this is not the same as Appellants' selecting a best match based upon the total number of characters matched to each of the candidate character sets, as set forth in the claim. Therefore, for at least this additional reason, Appellants respectfully request that the rejection of claim 6 be withdrawn.

Claims 14, 22, and 30 include features similar to those discussed above with regard to claim 6. For at least the additional foregoing reasons, Appellants submit that the rejection of these claims are improper and must be withdrawn.

Dependent Claims 7, 15, 23, and 31

Claims 7, 15, 23, and 31 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead. Dependent claims 7, 15, 23, and 31 each depend from a corresponding one of independent claims 1, 9, 17 and 25 and, therefore, contain the features recited in the independent claims. As mentioned above, Tateno and Halstead, alone or in combination with one another fail to teach or suggest each of the features in the independent claims and, thus, necessarily fail to teach or suggest each of the features in the dependent claims. Therefore, Appellants respectfully submit that claims 7, 15, 23, and 31 are also patentable at least by virtue of their dependency.

Furthermore, claim 7 includes, *inter alia*, the feature of "evaluating the characters of a query string." At least this feature is not taught or suggested by Tateno and Halstead, alone or in combination with one another.

Apparently, the Examiner relies on the disclosure in Halstead which is directed to hard phrase break analysis for breaking Japanese text input to teach this feature (See col. 5, lines 18-23 and fig. 1 of Halstead) However, this is not the same as Appellants' evaluating the characters of a query string against candidate character sets to generate a search index, as set forth in the claim.

Therefore, for at least this additional reason, Appellants respectfully request that the rejection of claim 7 be withdrawn.

Claims 15, 23, and 31 include features similar to those discussed above with regard to claim 7. For at least the additional foregoing reasons, Appellants submit that the rejection of these claims are improper and must be withdrawn.

Dependent Claims 8, 16, 24, and 32

Claims 8, 16, 24, and 32 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead. Dependent claims 8, 16, 24, and 32 each depend from a corresponding one of independent claims 1, 9, 17 and 25 and, therefore, contain the features recited in the independent claims. As mentioned above, Tateno and Halstead, alone or in combination with one another fail to teach or suggest each of the features in the independent claims and, thus, necessarily fail to teach or suggest each of the features in the dependent claims. Therefore, Appellants respectfully submit that claims 8, 16, 24, and 32 are also patentable at least by virtue of their dependency.

Furthermore, claim 8 includes, *inter alia*, the feature of “performing a search of the query string against search indices whose character set matches the character set of the query string.” At least this feature is not taught or suggested by Tateno and Halstead, alone or in combination with one another.

Apparently, the Examiner relies on the disclosure in Halstead which is directed to matching of morphemes and context indexing to teach this feature (See col. 12, lines 65-67 and col. 13, lines 56-61 of Halstead). The Examiner further relies on the disclosure in Tateno to a search index for tagged target words to teach this feature (See Col. 9, lines 20-25, and fig 1 of Tateno). However, these are not the same as Appellants’ performing a search of the query string against search indices whose character set matches the character set of the query string, as set forth in the claim. Therefore, for at least this additional reason, Appellants respectfully request that the rejection of claim 8 be withdrawn.

Claims 16, 24, and 32 include features similar to those discussed above with regard to claim 8. For at least the additional foregoing reasons, Appellants submit that the rejection of these claims are improper and must be withdrawn.

Dependent Claims 3, 11, 19, and 27

Claims 3, 11, 19, and 27 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over a Tateno in view of Halstead and further in view of Houchin. Appellants respectfully traverse this rejection because Tateno, Halstead or Houchin, alone or in combination with one another do not teach or suggest all the features of the claims.

Claims 3, 11, 19, and 27 each depend from one of independent claims 1, 9, 17 and 25 and, therefore, contain the features recited in the independent claims. Independent claims 1, 9, 17, and 25 include, *inter alia*, the feature of *evaluating the search string by comparing each of the characters of the search string to a plurality of pre-determined candidate character sets to determine one or more matches between the plurality of pre-determined candidate character sets and the search string*. As mentioned above, Tateno and Halstead, alone or in combination with one another, are deficient in teaching or suggesting this feature.

Appellants submit that the above deficiencies of Tateno and Halstead are not overcome by Houchin. Houchin discloses a system and method for comparing a search string against key words in a data structure (See Fig. 3, col.2 lines 20-31, and col. 3, lines 59-64 of Houchin) and does not teach or suggest *comparing each of the characters of the search string to a plurality of pre-determined candidate character sets to determine one or more matches between the plurality of pre-determined candidate character sets and the search string* as set forth in claims. As a result, claims 3, 11, 19, and 27 are also patentable for at least the foregoing reasons, by virtue of their dependency.

Claim 37

Claim 37 stands rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead and further in view of Marshall.

Claim 37 recites, *inter alia*, the feature that *each of the character sets represented in the character bank that correspond to each of the characters of the search string are compared to pre-selected character set indicators of a bit mask to determine a match between each of the character sets represented in the character bank that correspond to the characters of the search string and the characters set indicators of the bit mask*. At least this feature is not taught or suggested in Tateno, Halstead or Marshall, alone or in combination with one another.

The Examiner acknowledges that both Tateno and Halstead do not teach 'character set indicators of a bitmask to determine a match between each of the character sets (See the Office Action, page 23, lines 5-6). However, the Examiner alleges that Marshall teaches a system which includes 'character set indicators of a bitmask to determine a match between each of the character set' (See the Office Action, page 23, lines 6-8). The Examiner relies on the abstract, page 14, lines 14-31, page 16, lines 18-30, Figures 3 and 4 in Marshall to teach this feature.

Appellants respectfully submit that the portions relied upon by the Examiner in Marshall discloses matching a pattern of characters (i.e., a group of characters as a whole) against a text to identify occurrences of matching patterns in the text. In contrast, the Appellants' invention is directed to comparing representations of each character of a text against pre-selected character set indicators of a bitmask.

Accordingly, Marshall does not teach or suggest the claimed feature of *each of the character sets represented in the character bank that correspond to each of the characters of the search string are compared to pre-selected character set indicators of a bit mask to determine a match between each of the*

character sets represented in the character bank that correspond to the characters of the search string and the characters set indicators of the bit mask, as set forth in claim 37. As a result, Appellants respectfully submit that claim 37 is patentable over Tateno in view of Halstead and further in view of Marshall. For at least this reason, Appellants respectfully request that the rejection of claim 37 be withdrawn.

In addition, claim 37 includes, *inter alia*, the features of “a first column of the character bank corresponds to a first column of the bit mask,” and “the first column of the character bank and the first column of bit mask correspond to the same character set.” At least these features are not taught or suggested in Tateno, Halstead or Marshall, alone or in combination with one another. Appellants respectfully submit that the Examiner has not addressed these foregoing features and a combination of the foregoing features for the rejection of claim 37. Accordingly, the rejection of claim 37 is improper. For at least this additional reason, Appellants respectfully request that the rejection of claim 37 be withdrawn.

Claims 40-43

Claims 40-43 have been rejected under 35 U.S.C. 103 (a) as allegedly being unpatentable over Tateno in view of Halstead and further in view of Marshall. Claim 40 includes, *inter alia*, the features of, “*filling the columns of the character table bank to indicate whether or not the at least one character of the string is supported by corresponding pre-determined candidate character sets,*” “*creating a bit mask comprising columns equivalent in number to the number of columns in the character table bank,*” “*filling the columns of the bit mask to provide an indication of the plurality of pre-determined character sets against which the filled columns of the character table bank are to be matched,*” and “*evaluating the search string by comparing the filled character table bank against the filled columns of the bit mask,*” among other things. At least this combination

of feature is not taught or suggested in Tateno, Halstead or Marshall, alone or in combination with one another. Appellants respectfully that the Examiner has not addressed the foregoing features and the combination of the foregoing features for the rejection of claim 40. Accordingly, the rejection of claim 40 is improper. Claims 41-43 include features similar to those discussed above with regard to claim 40. For at least the foregoing reasons, Appellants submit that the rejection of these claims are also improper and must be withdrawn.

Conclusion

Because the references relied upon by the Examiner, either alone or in combination with one another, fail to disclose, teach or suggest all of the features of the claims as set forth above, Appellants respectfully request that the rejection of each of pending claims 1-32, 37, and 40-43 under 35 U.S.C. §103(a) be reversed.

Respectfully submitted,

MINTZ, LEVIN, COHN, FERRIS,
GLOVSKY AND POPEO, P.C.

Dated: October 31, 2003

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APPENDIX A – PENDING CLAIMS

1. **(Previously Amended)** A method of evaluating characters in an inputted search string to generate a search index, comprising the steps of:
 - a) accepting an input of the characters of the search string, wherein the characters can be represented in any of a plurality of character sets corresponding to an undetermined language;
 - b) evaluating the search string by comparing each of the characters of the search string to a plurality of pre-determined candidate character sets to determine one or more matches between the plurality of pre-determined candidate character sets and the search string; and
 - c) generating the search index by assigning character sets to a code page, wherein the character sets are assigned based on the results of the evaluation of the characters of the search string and the plurality of pre-determined candidate character sets that correspond to the characters of the search string.
2. **(Previously Amended)** The method of claim 1, wherein the comparing of step (b) comprises the step of comparing each character of the search string to an entry for each of the candidate character sets in a character table bank.
3. **(Original)** The method of claim 2, wherein the step of comparing each character comprises the step of testing the ability of each candidate character set to express that character by performing a logical mask between a universal code for that character and an indicator in the character table bank indicating whether each of the candidate character sets contains that character.
4. **(Original)** The method of claim 3, wherein the universal code is Unicode.

5. **(Original)** The method of claim 1, further comprising the step of (d) computing a total number of characters matched to each of the candidate character sets.
6. **(Original)** The method of claim 1, further comprising the step of (e) selecting a best match based upon the total number of characters matched to each of the candidate character sets.
7. **(Original)** The method of claim 1, further comprising the step of (f) evaluating the characters of a query string.
8. **(Original)** The method of claim 7, further comprising the step of (g) performing a search of the query string against search indices whose character set matches the character set of the query string.
9. **(Previously Amended)** A system for evaluating characters in an inputted search string to generate a search index, comprising:
 - an input interface to accept an input of the characters of the search string, wherein the characters can be represented in any of a plurality of character sets corresponding to an undetermined language; and
 - a processor unit, connected to the input interface, the processor unit evaluating the search string by comparing each of the characters of the search string to a plurality of pre-determined candidate character sets to determine one or more matches between the plurality of pre-determined candidate character sets and the search string, and generating the search index by assigning character sets to a code page, wherein the character sets are assigned based on the results of the evaluation of the characters of the search string and the

plurality of pre-determined candidate character sets that correspond to the characters of the search string.

10. **(Previously Amended)** The system of claim 9, wherein the processor unit compares each character of the search string to an entry for each of the candidate character sets in a character table bank.
11. **(Original)** The system of claim 10, wherein the processor unit tests the ability of each candidate character set to express that character by performing a logical mask between a universal code for that character and an indicator in the character table bank indicating whether each of the candidate character sets contains that character.
12. **(Original)** The system of claim 11, wherein the universal code is Unicode.
13. **(Original)** The system of claim 9, wherein the processor unit computes a total number of characters matched to each of the candidate character sets.
14. **(Original)** The system of claim 9, wherein the processor unit selects a best match based upon the total number of characters matched to each of the candidate character sets.
15. **(Original)** The system of claim 9, wherein the processor unit evaluates the characters of a query string.
16. **(Original)** The system of claim 15, wherein the processor unit performs a search of the query string against search indices whose character set matches the character set of the query string.

17. **(Previously Amended)** A system for evaluating characters in an inputted search string to generate a search index, comprising:

input interface means to accept an input of the characters of the search string, wherein the characters can be represented in any of a plurality of character sets corresponding to an undetermined language; and

processor means, connected to the input interface means, the processor means evaluating the search string by comparing each of the characters of the search string to a plurality of pre-determined candidate character sets to determine one or more matches between the plurality of pre-determined candidate character sets and the search string, and generating the search index by assigning character sets to a code page, wherein the character sets are assigned based on the results of the evaluation of the characters of the search string and the plurality of pre-determined candidate character sets that correspond to the characters of the search string.

18. **(Previously Amended)** The system of claim 17, wherein the processor means compares each character of the search string to an entry for each of the candidate character sets in a character table bank.

19. **(Original)** The system of claim 18, wherein the processor means tests the ability of each candidate character set to express that character by performing a logical mask between a universal code for that character and an indicator in the character table bank indicating whether each of the candidate character sets contains that character.

20. **(Original)** The system of claim 19, wherein the universal code is Unicode.

21. **(Original)** The system of claim 17, wherein the processor means computes a total number of characters matched to each of the candidate character sets.
22. **(Original)** The system of claim 17, wherein the processor means selects a best match based upon the total number of characters matched to each of the candidate character sets.
23. **(Original)** The system of claim 17, wherein the processor means evaluates the characters of a query string.
24. **(Original)** The system of claim 23, wherein the processor means performs a search of the query string against search indices whose character set matches the character set of the query string.
25. **(Previously Amended)** A storage medium for storing machine readable code, the machine readable code being executable to evaluate characters in an inputted electronic search string according to the steps of:
- a) accepting an input of the characters of the search string, wherein the characters can be represented in any of a plurality of character sets corresponding to an undetermined language;
 - b) evaluating the search string by comparing each of the characters of the search string to a plurality of pre-determined candidate character sets to determine one or more matches between the plurality of pre-determined candidate character sets and the search string; and
 - c) generating the search index by assigning character sets to a code page, wherein the character sets are assigned based on the results of the evaluation of the characters of the search string and the plurality of pre-

determined candidate character sets that correspond to the characters of the search string.

26. **(Previously Amended)** The storage medium of claim 25, wherein the comparing of step (b) comprises the step of comparing each character of the search string to an entry to each of the candidate character sets in a character table bank.

27. **(Original)** The storage medium of claim 26, wherein the step of comparing each character comprises the step of testing the ability of each candidate character set to express that character by performing a logical mask between a universal code for that character and an indicator in the character table bank indicating whether each of the candidate character sets contains that character.

28. **(Original)** The storage medium of claim 27, wherein the universal code is Unicode.

29. **(Original)** The storage medium of claim 25, wherein the steps further comprise the step of (d) computing a total number of characters matched to each of the candidate character sets.

30. **(Original)** The storage medium of claim 25, wherein the steps further comprise the step of (e) selecting a best match based upon the total number of characters matched to each of the candidate character sets.

31. **(Original)** The storage medium of claim 25, wherein the steps further comprise the step of (f) evaluating the characters of a query string.

32. **(Original)** The storage medium of claim 31, wherein the steps further comprise the step of (g) performing a search of the query string against search indices whose character set matches the character set of the query string.

33. **(Cancelled).**

34. **(Cancelled).**

35. **(Cancelled).**

36. **(Cancelled).**

37. **(Previously Amended)** A method of evaluating characters in an inputted search string to generate a search index, comprising the steps of:

- a) accepting an input of the characters of the search string, wherein the characters can be represented in any of a plurality of character sets corresponding to an undetermined language;
- b) evaluating the search string by comparing each of the characters of the search string to a plurality of pre-determined candidate character sets to determine one or more matches between the plurality of pre-determined candidate character sets and the search string, wherein each of the characters of the search string are compared to one or more character sets of a character bank by parsing the characters of the search string and identifying the one or more character sets of the character bank that express each of the characters of the search string, wherein each of the character sets represented in the character bank that correspond to each of the characters of the search string are compared to pre-selected character set indicators of a bit mask to determine a match between each of the character sets represented in the character bank that correspond to the characters of the search string and the characters set indicators of the bit mask, wherein a first column of the character bank corresponds to a first column of the bit mask, and wherein the first column of the

character bank and the first column of bit mask correspond to the same character set; and

c) generating a search index based on the results of the evaluation of the search string and the plurality of pre-determined candidate character sets.

38. **(Cancelled).**

39. **(Cancelled).**

40. **(Previously Added)** A method of evaluating characters in an inputted search string against a character table bank comprising a predetermined number of columns that correspond to a plurality of pre-determined candidate character sets in order to provide enhanced full text search features, the method comprising:

accepting the inputted search string having at least one character;

comparing the at least one character of the inputted search string to the plurality of pre-determined candidate character sets;

filling the columns of the character table bank to indicate whether or not the at least one character of the string is supported by corresponding pre-determined candidate character sets;

creating a bit mask comprising columns equivalent in number to the number of columns in the character table bank;

filling the columns of the bit mask to provide an indication of the plurality of pre-determined character sets against which the filled columns of the character table bank are to be matched;

evaluating the search string by comparing the filled character table bank against the filled columns of the bit mask; and

generating a search index based on the results of the evaluation.

41. **(Previously Added)** A system for evaluating characters in an inputted search string against a character table bank comprising a predetermined number of columns that correspond to a plurality of pre-determined candidate character sets in order to provide enhanced full text search features, the system comprising:

- an accepting module that accepts the inputted search string having at least one character;

- a comparing module that compares the at least one character of the inputted search string to the plurality of pre-determined candidate character sets;

- a bank filling module that fills the columns of the character table bank to indicate whether or not the at least one character of the string is supported by corresponding pre-determined candidate character sets;

- a creating module that creates a bit mask comprising columns equivalent in number to the number of columns in the character table bank;

- a mask filling module that fills the columns of the bit mask to provide an indication of the plurality of pre-determined character sets against which the filled columns of the character table bank are to be matched;

- an evaluating module that evaluates the search string by comparing the filled character table bank against the filled columns of the bit mask; and

- an index generating module that generates a search index based on the results of the evaluation.

42. **(Previously Added)** A system for evaluating characters in an inputted search string against a character table bank comprising a predetermined number of columns that correspond to a plurality of pre-determined candidate character sets in order to provide enhanced full text search features, the system comprising:

- accepting means that accepts the inputted search string having at least one character;

comparing means that compares the at least one character of the inputted search string to the plurality of pre-determined candidate character sets;

bank filling means that fills the columns of the character table bank to indicate whether or not the at least one character of the string is supported by corresponding pre-determined candidate character sets;

creating means that creates a bit mask comprising columns equivalent in number to the number of columns in the character table bank;

mask filling means that fills the columns of the bit mask to provide an indication of the plurality of pre-determined character sets against which the filled columns of the character table bank are to be matched;

evaluating means that evaluates the search string by comparing the filled character table bank against the filled columns of the bit mask; and

index generating means that generates a search index based on the results of the evaluation.

43. **(Previously Added)** A storage medium for storing machine readable code, the machine readable code being executable to evaluate characters in an inputted search string against a character table bank comprising a predetermined number of columns that correspond to a plurality of pre-determined candidate character sets in order to provide enhanced full text search features, the method comprising:

accepting the inputted search string having at least one character;

comparing the at least one character of the inputted search string to the plurality of pre-determined candidate character sets;

filling the columns of the character table bank to indicate whether or not the at least one character of the string is supported by corresponding pre-determined candidate character sets;

creating a bit mask comprising columns equivalent in number to the number of columns in the character table bank;

filling the columns of the bit mask to provide an indication of the plurality of pre-determined character sets against which the filled columns of the character table bank are to be matched;

evaluating the search string by comparing the filled character table bank against the filled columns of the bit mask; and
generating a search index based on the results of the evaluation.